SECTION 208 - MACHINE LAID SEAL

1. DESCRIPTION

This work shall consist of plant mixing and the machine paving of hot mix bituminous materials, applied to an existing surface which has been previously surfaced with asphaltic concrete, bituminous mat, concrete, brick or treated with bituminous materials.

When so specified in this section, materials, equipment and construction shall conform to the 1980 Edition of the Standard Specifications for State Road and Bridge Construction as published by the Kansas Department of Transportation, hereinafter referred to as the "Standard Specifications."

2. MATERIALS

A. Bituminous Material. The asphalt cement mixed with the mineral aggregate shall be AC-5, and the emulsified asphalt for tack shall be SS-1H and shall comply with the "Standard Specifications."

B. Mineral Aggregate (BM-1).

1. Description. Mineral aggregate for asphaltic concrete pavement shall be chat, crushed gravel, crushed stone, sand and mineral filler singly or in combination such that they will meet the requirements as hereinafter specified.

Chat shall consist of pile run on screened mine tailings produced during the milling of zinc or lead in the mining district of Southeast Kansas, Southwest Missouri and Northeast Oklahoma.

Crushed gravel shall be produced by crushing siliceous and/or calcareous gravel all of which, before crushing, shall be retained on a screen having a minimum opening one and one-half (1-1/2) times as large as the maximum size permitted by the grading requirements.

Crushed stone shall be produced by crushing limestone, sandstone, or other types of stone which meets the quality requirements specified in this section and the "Standard Specifications." The screenings shall be crushed from stone that complies with the quality requirements of this special provision and shall be within the following grading limits:

Retained on 1/2" Sieve- -- - - - - - - - - 0%
Retained on No. 200 Sieve- - - - - - - -96% to 100%

2. Quality Requirements:

a. Soundness. The loss ratio of aggregate from each individual source shall not be less than ninety hundredths (0.90) when subjected to twenty-five cycles of freezing and thawing.

b. Wear. The wear loss of aggregate from each individual source shall not exceed forty (40) per cent when tested by the Los Angeles Test

Method.

The requirements for soundness and wear do not apply to sand-gravel aggregate sources having less than ten (10) per cent material retained on the No. 8 mesh sieve.

c. Absorption. The water absorption of aggregate from each individual source shall not exceed four per cent.

Tests to determine conformance of crushed stone to the requirements of subarticles 2 a., b., and c., shall be conducted on samples obtained as follows:

Commercial quarries in regular operation shall be sampled from normal production.

Roadside quarries (Portable Plants - Intermittent Production) shall be sampled from normal production.

Unopened quarry sites shall be sampled by opening the quarry face for the full depth of the ledge or ledges and sufficiently back from the exposure to reach unweathered stone. From this opening, the full depth of the unweathered face shall be shot down and the material crushed and sampled for quality tests.

d. Deleterious Substances. Aggregates for use in this work shall be free from alkali, acids, organic matter, or injurious quantities of other foreign substances. Permitted quantities of other deleterious substances are stated below.

The deleterious substances in each individual aggregate shall not exceed the following percentages by weight:

Sticks (Wet Weight)	0.1
Shale	0.5
Coal	0.5
Soft Friable Materials	2.5

The above percentages are when taken separately. In addition any combination of the above shall not exceed three (3.0) per cent.

3. Size Requirements. The combination of aggregate and mineral filler used for asphaltic machine laid seal construction shall be uniformly graded from coarse to fine. The gradation of each sample shall be determined by the use of square mesh U.S. Standard sieves of the sizes as indicated for each aggregate type.

The aggregate shall consist of a combination of crushed stone and/or crushed gravel, chat, uncrushed sand-gravel, sand and mineral filler. The combined

material shall contain not less than thirty (30) per cent crushed stone or crushed gravel and a minimum of 15% natural sand from an alluvial deposit. The material passing the No. 200 sieve in the crushed material, including that in crushed or manufactured sand, shall be considered crushed stone or crushed gravel.

Immediately prior to the addition of the asphalt the combined aggregate shall be within the following grading limits:

Retained on 1/2" Sieve- - - - - - - - - - - 0%
Retained on 3/8" Sieve- - - - - - - - - - - 0% - 8%
Retained on No. 4 Sieve - - - - - - - - - 18% - 39%
Retained on No. 8 Sieve - - - - - - - - - 35% - 53%
Retained on No. 16 Sieve- - - - - - - - -50% - 68%
Retained on No. 30 Sieve- - - - - - - - -60% - 80%
Retained on No. 50 Sieve- - - - - - - - -70% - 88%
Retained on No. 100 Sieve - - - - - - - 80% - 92%
Retained on No. 200 Sieve - - - - - - - 90% - 96%
Plastic Index, Not More Than- - - - - 6%
Moisture in Final Mixture, Maximum- -0.7%

In addition to the above grading requirements, not more than thirty (30) per cent of the total material passing the No. 200 sieve shall be present in the uncrushed aggregate. The remaining material passing the No. 200 sieve shall be present in the crushed aggregate as a result of crushing the aggregate, or shall be obtained by adding mineral filler meeting the requirements of mineral filler.

4. Mineral Filler. Mineral filler shall be the material added to secure the required percentage of material passing the number 200 sieve in the final mix. It shall be a finely divided material free from injurious quantities of organic matter and it shall be approved by the Engineer. Mineral filler shall be mineral dust produced by crushing stone, predominately siliceous sand or gravel or it shall be Portland Cement, dewatered chat sludge, volcanic ash (Silica) or fly ash. Fly ash shall be a finely divided residue that results from the combustion of ground or powdered coal.

Mineral filler shall be friable and free of cemented lumps and shall comply with the following requirements:

Retained on No. 8 Sieve - - - - - - - - - - - - -0%
Retained on No. 30 Sieve- - - - - - - - - - - - 0% - 5%
Retained on No. 200 Sieve - - - - - - - - - - -0% - 40%

5. Plasticity Index of Individual Aggregates. Individual aggregates containing minus 200 mesh material in excess of four (4) per cent by weight shall not have a plastic index of more than six (6) as determined by tests on the fraction passing the number 40 sieve. Plastic index tests need not be conducted on individual aggregates that contain less than four (4) per cent material passing

the No. 200 sieve.

6. Plasticity Index of Mineral Filler. The plastic index of material added as mineral filler shall not be more than four (4).

7. METHODS OF TEST:

Sieve Analysis
*Material Passing No. 200 Sieve
Wear
Sampling
Shale
Coal and Lignite in Sand
Soundness
Plasticity Tests
**Absorption
Moisture in Final Mixture

*NOTE: The sample after removal of the minus 200 material by washing, shall be dry screened through a nest of sieves including the No. 200 mesh to determine conformance with the grading requirements of this specification. The percentage of the original sample remaining on the No. 200 mesh sieve after both wash and dry screening shall be the percentage "Retained on No. 200 sieve" referred to in this specification.

**NOTE: Samples of sand-gravel containing 15% or less of material retained on the 3/8" sieve shall be tested for absorption by method ASHO 84. Samples of sand-gravel containing more than 15% of material retained on the 3/8" sieve shall be tested for absorption by method AASHO T85. All crushed stone samples shall be tested for absorption by method AASHO T85.

3. CONSTRUCTION EQUIPMENT AND REQUIREMENTS

A. Equipment. Equipment shall conform to "Standard Specifications" and revision thereof for Asphaltic Concrete.

B. Construction Requirements.

1. Preparation of Asphalt Cement. This material shall be heated within a temperature range of 275 degrees F. to 325 degrees F. at the time of mixing.

2. Mineral Aggregates. Aggregates shall be prepared in accordance with asphaltic concrete specifications except that two (2) sizes of aggregate conveyed into separate bins ready for batching will be accepted with uniformly graded materials.

3. Preparation. Preparation of the bituminous mixture shall comply with asphaltic concrete specifications except for the wet mixing time which shall be a minimum of 40 seconds and may be increased by the Engineer, if in his opinion more time is necessary to obtain a homogeneous mixture.

4. Preparation of the Existing Surface. The surface shall be cleaned of all foreign material before the application of a tack coat. The tack coat shall

consist of approximately ten-hundredths (0.10) of a gallon per square yard. The tack coat shall be SS-1H emulsified asphalt. The emulsified asphalt for tack shall be diluted with water as directed by the Engineer.

5. Placing the Mixture. The mixed material shall be spread with a bituminous paver with the best finish possible within the average maximum thickness. The mixed material shall be placed in one lift to achieve an overlay thickness of 3/4".

6. Compaction of Mixtures. After spreading and strike off, the mixture will be compacted by rolling as directed by the Engineer with the minimum of two rollers. All compaction rolling shall be completed prior to the mixture cooling to a temperature less than 185 degrees F.

4. WEATHER LIMITATIONS

Hot asphaltic mixtures shall be placed only when the air temperature is forty (40) degrees F. or above, when the weather is not rainy or foggy and when the existing surface is free from moisture.